

NetShelter® VX

Seismic Enclosure

User's Manual

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Product Overview

The American Power Conversion NetShelter[®] VX Seismic Enclosure is a high-quality enclosure for storage of industry-standard (EIA-310), 19-inch rack-mount hardware, which includes servers, voice, data, networking, internetworking, and APC power-protection equipment.

NetShelter VX Seismic Enclosure

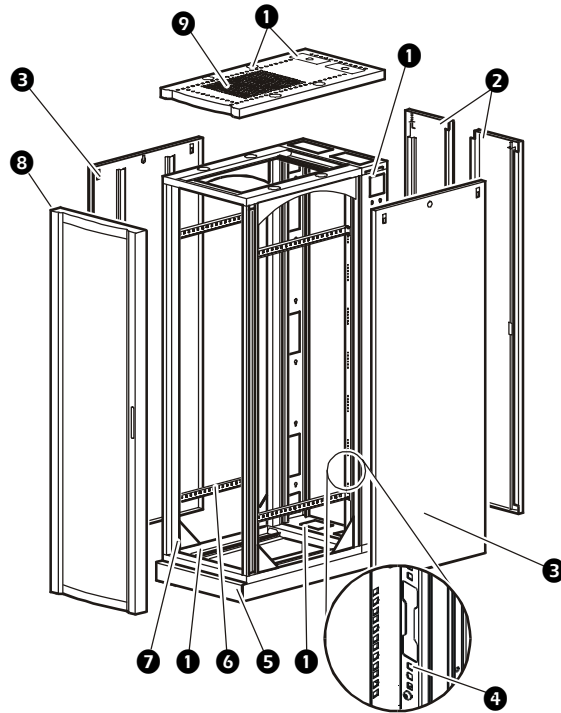
The NetShelter models listed below are certified for 1000 lb to NEBS GR-63-CORE zone 4 standards.

Model	Rack Mounting Height	Rack Mounting Width	External Enclosure Width	Description
AR2144 AR2144BLK	42U [†]	EIA 19in	600mm	Enclosure with sides
AR2145 AR2145BLK	42U	EIA 19in	600mm	Enclosure without sides

[†] One U = 1.75 in. (4.44 cm)

Product Inventory

Features of the enclosure



Features of the enclosure	
Cable access	<ul style="list-style-type: none"> • Access on roof, sides, and base ❶
Doors	<ul style="list-style-type: none"> • Ventilated split rear door for added access in narrow aisles ❷ • Quick-release, ventilated, reversible front door ❸ • Front and rear door locks
Side panels	<ul style="list-style-type: none"> • Side panels with locks ❹ (enclosures with sides only)
Frame	<ul style="list-style-type: none"> • 42U (73.5in) of storage height for 19-inch rack-mount equipment • Adjustable vertical mounting rails ❺ and horizontal braces ❻ • Front and rear skirt ❼ • Frame posts ❼ • Ground studs on all panels and main structure
Roof	<ul style="list-style-type: none"> • Ventilated roof ❽

**Hardware, grommets,
and covers**

Item	AR2144 AR2144BLK	AR2145 AR2145BLK
Baying hardware		
Baying brackets	—	4
Vertical baying trim	—	1
M6 counter-sunk screws	—	4
M6 × 12 socket-head screws	—	8
M6 caged nuts	—	8
Mounting hardware		
M6 × 16mm Phillips/slotted screws	60	60
Caged nut installation tool	1	1
M6 caged nuts	60	60
Plastic cup washers	60	60
Open-ended wrench (13mm/14mm)	1	1
M5 Allen wrench	1	1
Door/side panel keys	2	2
Grommets/covers (included in bag)		
4 × 4" grommets	2	4
4 × 8" grommets	3	6
4 × 4" cover	4	4

Before Installation



Before you begin to unpack the enclosure, read and follow these warnings to prevent injury and damage:

- Use at least three people to unpack and assemble the enclosure.
- Stabilize the enclosure before installing the components—failure to do so could cause the enclosure to tip over.
- Do not extend more than one component from the enclosure at one time to prevent the enclosure from becoming dangerously unstable.
- Load the heaviest components first and place them toward the bottom of the enclosure to prevent the enclosure from becoming top-heavy.

Location of keys and mounting hardware

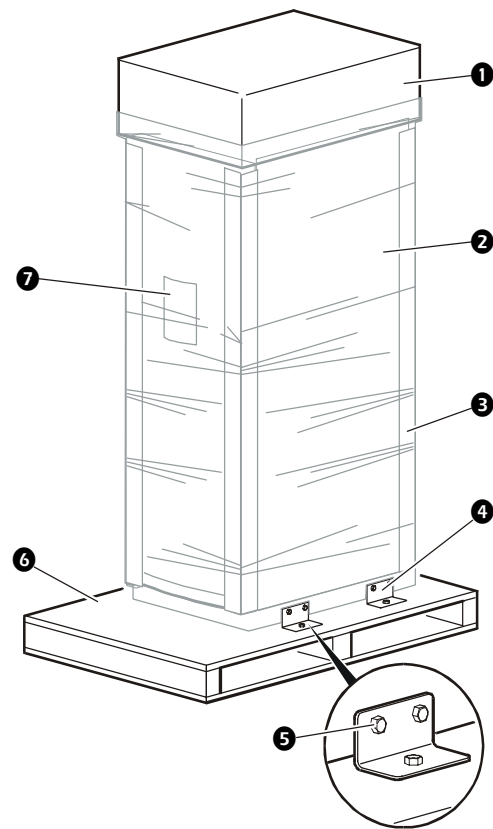
The keys are packed inside the enclosure, fastened at the top of one of the mounting rails. The bag containing the mounting hardware is fastened to the floor of the enclosure.

Tools required

The following tools (not included) will be necessary to unpack and adjust the enclosure:

- Phillips screwdriver
- Shears/utility knife

Packaging of the enclosure



- | | |
|-------------------------------|---------------------------------------------------------------------------------------------|
| ❶ Cardboard top cover | ❺ 13 mm bolts |
| ❷ Stretch wrap | ❻ Shipping pallet |
| ❸ Cardboard corner protectors | ❼ Pouch containing the open-ended wrench, this user's manual, warranty card, and literature |
| ❹ Pallet brackets | |

How to unpack the enclosure

1. Move the shipping pallet to a firm, level surface in an open area. Inspect the enclosure for visible signs of shipping damage. If you detect shipping damage, contact APC Customer Support at the number listed on the yellow sticker on the front of the enclosure.
2. Remove the open-ended wrench from the pouch on the front of the packaging.
3. Refer to the label on the packaging to determine where to cut the wrapping. Using heavy-duty shears or a utility knife, carefully remove the plastic stretch-wrap surrounding the enclosure.
4. Remove the cardboard cover and the four tall, cardboard corner

protectors.

5. Remove the four brackets that are anchoring the enclosure to the shipping pallet. Use the 13-millimeter end of the open-ended wrench (stored inside the pouch on the front of the enclosure packaging) to remove the 13-millimeter bolts that secure the brackets to the pallet.
6. With one person on each side of the enclosure, carefully slide it toward the rear of the pallet. The pallet will tip as the enclosure is moved to the rear of the pallet. Continue to slide the enclosure rearward until the rear edge makes contact with the floor.
7. While two people carefully tip the enclosure slightly away from the pallet, have the third person pull the pallet away from the enclosure.



Note

Save the pallet, mounting brackets, and bolts if you plan to reship the enclosure.

Please recycle



The shipping materials are recyclable. Please save them for later use, or dispose of them appropriately.

Disclaimer

APC is not responsible for damage sustained during reshipment of this product.

Take inventory

After unpacking the enclosure, verify that all required components and hardware have been shipped with the enclosure. See the product inventory section for a list of components.



Note

If any items are missing, contact APC Customer Support using the appropriate number or Web address listed on the back cover of this manual.

Configuration

Before installing your enclosure, plan the location of the equipment to be installed. Consider the space needed by equipment and ergonomics of keyboards and video monitors.

The NetShelter Configurator, available on the APC Web site, helps you plan your configuration to maximize the available U-space of your enclosure.



To maintain proper airflow, cover any empty vertical enclosure space with optional blanking panels (AR8101 and AR8101BLK for 19-inch equipment mounting, not included). Improper airflow could damage installed components.

To avoid damage or injury, stabilize the enclosure in its permanent location before loading equipment.

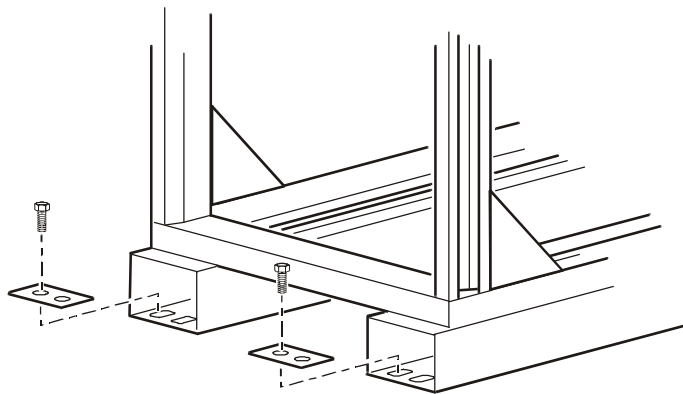
How to bolt the enclosure to the floor

For seismic stability, the NetShelter VX Seismic Enclosure must be bolted to the floor. Proper anchoring hardware should already be in place before starting this procedure.

Tools and hardware required

Qty	Item
4	Bolt plates (included)
8	M12 or 1/2-inch bolts (not included)
1	Adjustable wrench (not included)
1	Torque wrench (not included)

1. Remove the front and rear skirts on the enclosure. (See “How to remove the skirts” on page 14.)
2. Insert two bolts through each plate and the holes in the plinth, using the bolt plate (included). Screw the bolts into the pre-installed anchoring hardware in the floor.



3. Tighten the bolts to 60 pound-feet (81 newton-meters), using a torque wrench.

How to remove and install the side panels

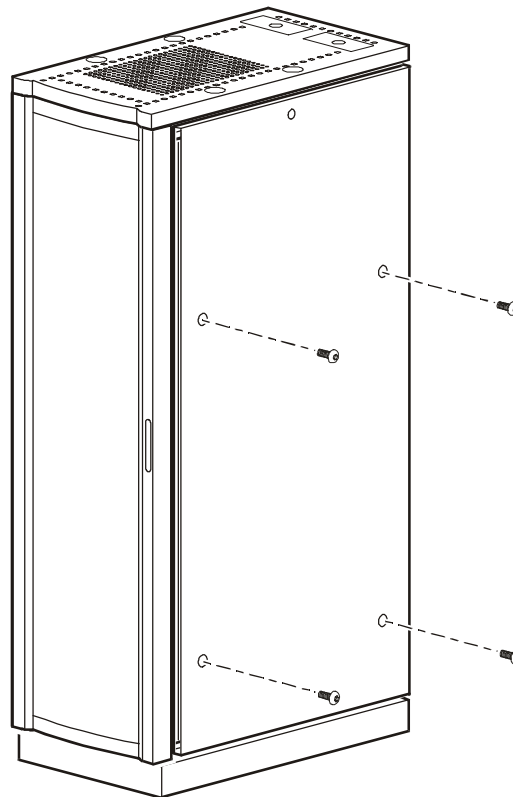
You can remove the side panels for access to the interior.



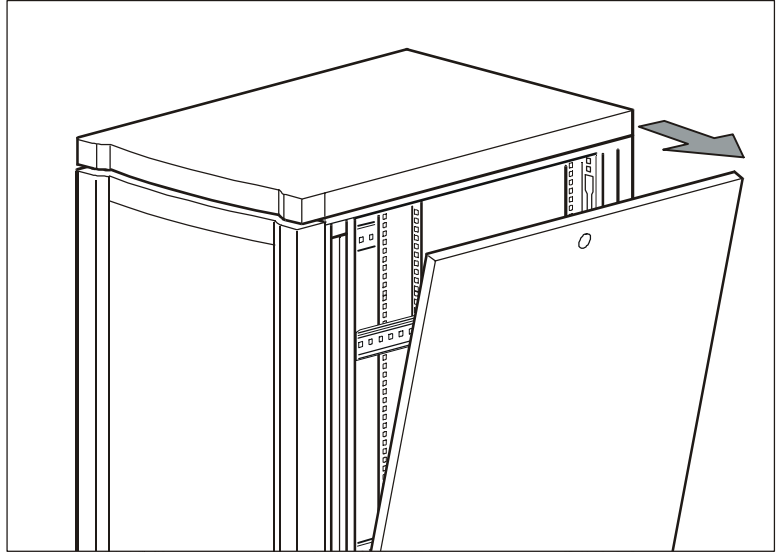
To avoid personal injury or damage to the enclosure, one person should support the side panel while another releases the side panel from its frame.

To remove the side panels:

1. Use the key to unlock the panel, if necessary.
2. Unscrew all four screws holding the panel; start from the bottom and work up.

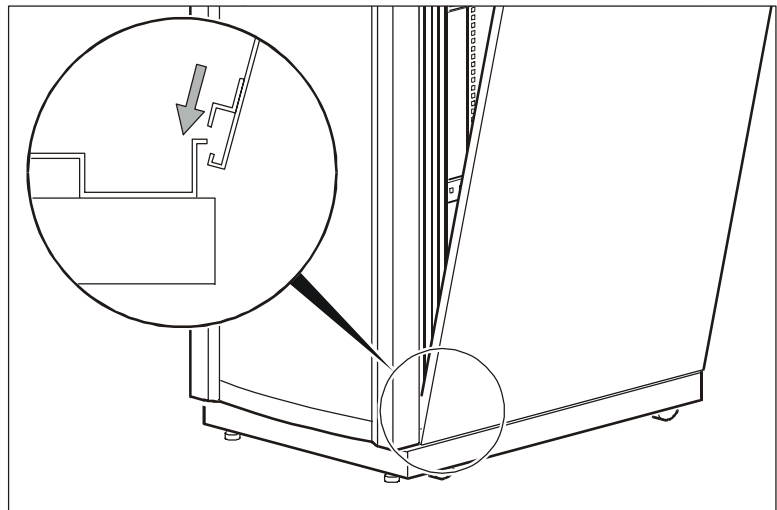


3. Tip the top of the panel away from the enclosure.
4. Lift the panel up and off the narrow horizontal lip at the bottom of the enclosure frame.



To reinstall:

1. Engage the bottom of the panel securely with the lip before pushing the top of the panel forward into place.
2. Replace the screws, working from top to bottom.



Note

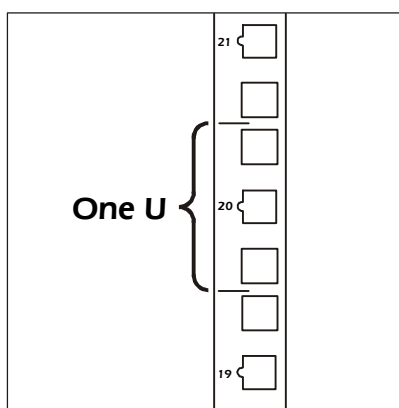
When installing the side panels on an extension enclosure, be sure to remove the plastic grommets from the rear, side-facing, cable-access openings on the rear cabling channel.

Installing Equipment

This section gives general information on installing rack-mount equipment in the enclosure. Also see the instructions provided with the equipment you are installing.

How to identify one U-space on the mounting rail

When installing equipment, you will need to locate the top and bottom of a U-space on the mounting rails. Every third hole on the mounting rails of a NetShelter enclosure is notched and numbered to indicate the middle of a U-space. A U-space consists of one of these numbered holes and one hole immediately above and below it, as shown.



How to install and remove caged nuts

During installation of equipment in your enclosure, you may need to install or remove caged nuts.

To install:



Warning

Install caged nuts horizontally, with the ears engaging the sides of the square hole. Do NOT install caged nuts vertically with the ears engaging the top and bottom of the square hole.

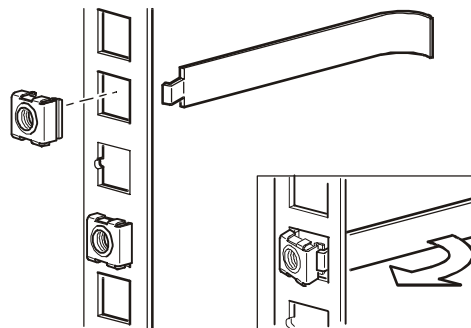
1. Insert the caged nut into the square hole by hooking one ear of the caged nut assembly through the far side of the hole.



Note

Install the caged nuts on the interior of the mounting rails.

2. Place the caged nut tool (included) on the other ear of the caged nut and pull to snap it into position.



To remove: Remove any attached screw and reverse the action in step 2. Grasp the caged nut before releasing the tool.

Grounding studs

There are twenty-two grounding studs on the enclosure, located on the doors, the roof, the side panels, and the frame.

# of studs	Location
12	Base
1	Rear cabling channel
1	Roof
2	Front door
4	Rear doors
2	Side panels (enclosures with sides only)

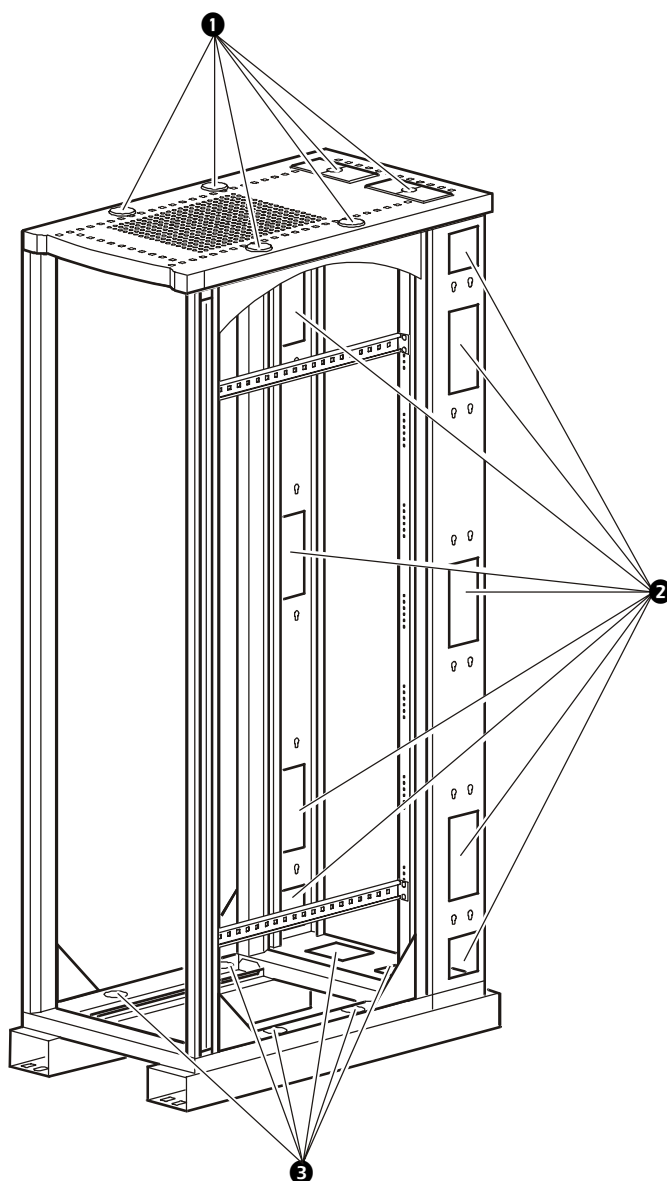
APC offers an optional grounding kit (AR8390) for bonding the enclosure.

Cable Management

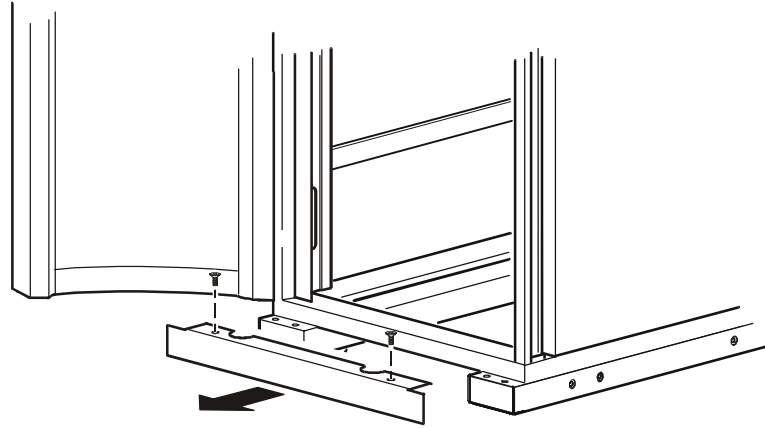
Location of cable access openings

There are cable access openings in the roof **1**, sides **2**, and base **3** of the enclosure. The rear cabling channel on the back of the enclosure provides clearance for wiring between the doors and the mounting rails. APC recommends using the clearance between the rear mounting rails and rear door for routing data and power cables—data on one side, and power on the other side.

Before routing wires through the side access holes on the enclosure with side panels, ensure the protective grommets (included) are installed into the cable access openings.

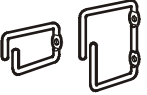

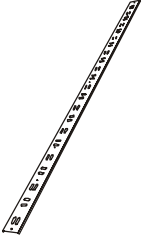


How to remove the skirts For additional cable access, you can remove the skirts at the front and rear of the enclosure by removing the two countersunk screws in each skirt.



Cable management options

APC offers the following products for managing cables in your enclosure:

Product	SKU	Description	Figure
Cable Management Hoops	AR8113A	Fasten cables to posts, mounting rails, or braces	
Cable Containment Kit	AR8116BLK	Fasten cables to rear cabling channel	
Side Cable Management Tray	AR8114BLK	Fasten cables to posts, mounting rails, or braces	

How to Reverse the Front Door

You can reverse or remove the front door to accommodate your site configuration. This section shows how to remove and reverse the door on your enclosure.

How to reverse the front door

Remove the side panels:

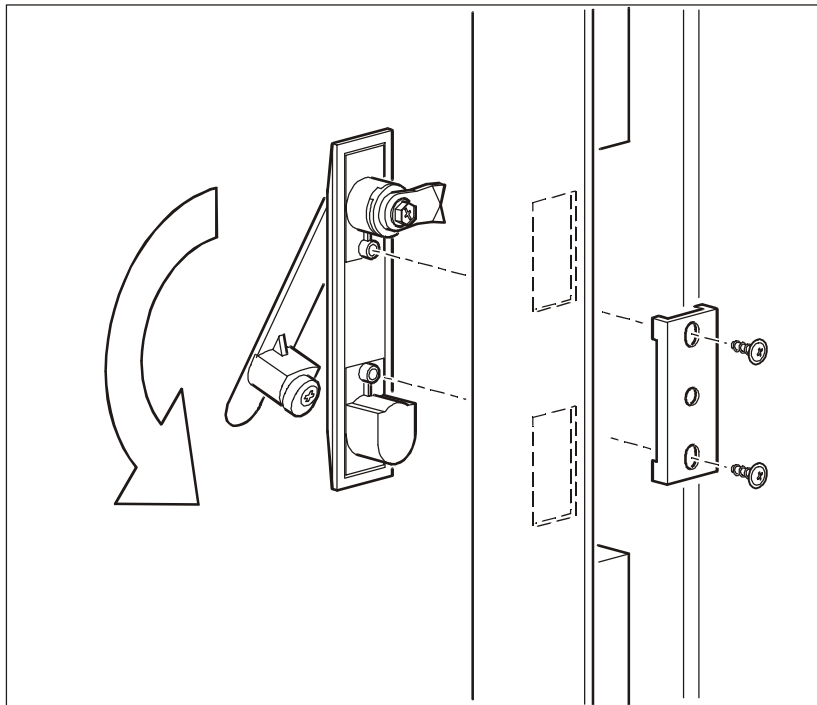
1. Remove both side panels.



See “How to remove and install the side panels” on page 8.

Reverse the door handle:

2. Remove the two Phillips screws from the rear of the door handle assembly and remove the handle assembly from the door.
3. Rotate the door handle assembly 180° and reinstall it, using the hardware removed in step 1.

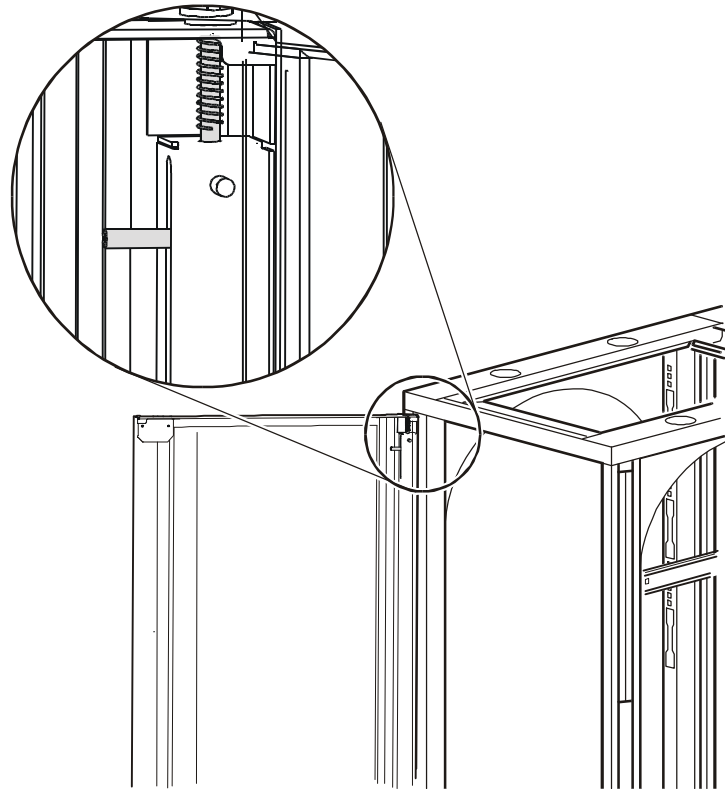


Remove the door:



To avoid personal injury or damage to the enclosure, one person should support the door while another places the door in its frame.

4. Open the door and pull down on the spring-loaded hinge pin attached to the top of the door. Lift the door from its frame and set it safely aside.



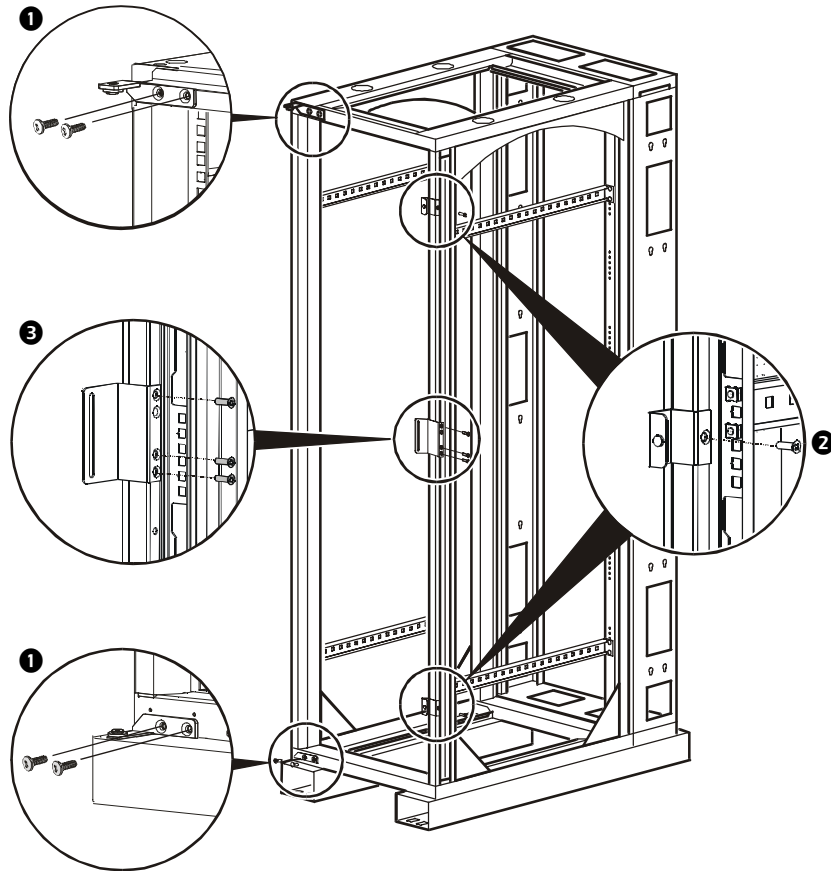
Remove the hinge pin, bumper, and latch brackets:



Note

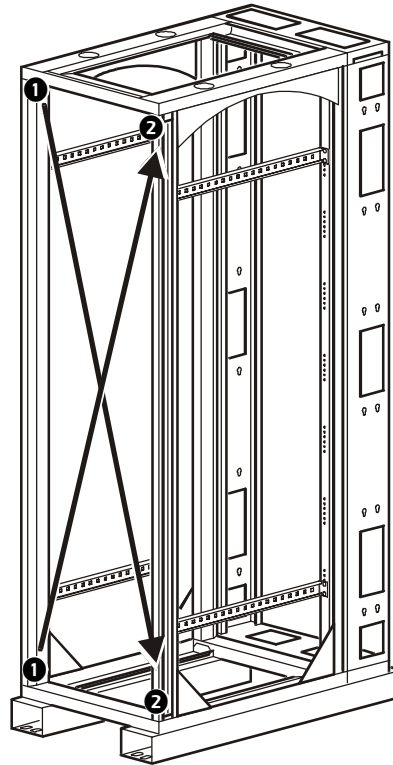
Remember the location of and distance between all items being removed. You will need to duplicate this positioning when reinstalling.

5. Use a Phillips head screwdriver (not included) to remove the hinge pin brackets **1**, bumper brackets **2**, and latch bracket **3** from the enclosure frame.



Reinstall the hinge pin brackets:

6. Reinstall the hinge pin brackets on the opposite side of the enclosure.
 - a. Remove the small plastic plugs covering the insertion holes in the base and the top of the enclosure frame. Reinstall them in the holes on the opposite side of the enclosure.
 - b. Relocate the two hinge pin brackets from their original position **1** to their new position **2**. Secure by tightening the screws.



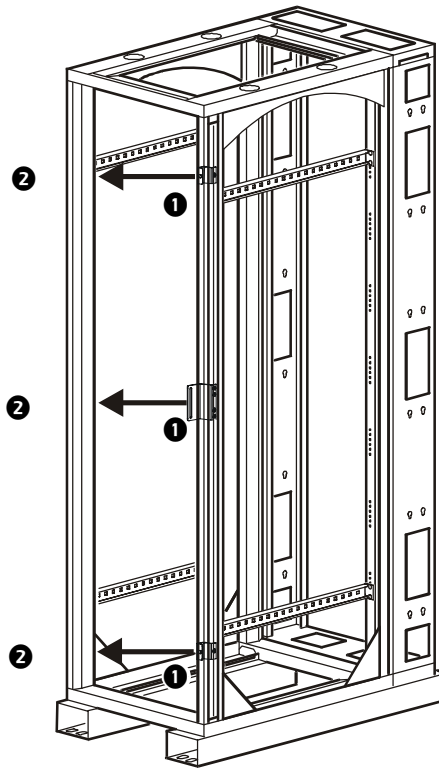
Reinstall the latch plate and bumpers:

7. Relocate the latch bracket and the two door bumper brackets from their original position **1** to their new position **2**.



Note

Be sure to maintain the original spacing between the latch plate and bumpers, as well as their vertical relationship with the enclosure frame.



Note

On the enclosure without sides, the baying trim is attached to the same holes used by the bumpers and latch bracket. See “How to move the trim” on page 27.

Reinstall the door assembly:

8. Loosely tighten the hinge pin brackets.
9. Reinstall the door assembly.



Warning

To avoid personal injury or damage to the enclosure, one person should support the door while another places the door in its frame.

- a. Align the lower door hinge pin with the hole in the bottom of the hinge pin bracket and slide the hinge pin into the hole.
 - b. Pull down the upper hinge pin.
 - c. Align the upper hinge pin with hole in the upper hinge pin bracket and release the hinge pin into the hole.
 - d. Make sure that the door opens and closes properly.
10. Firmly tighten the countersunk screws to secure the hinge pin brackets to the enclosure frame.
 11. If using the Base model, reinstall the side panels.



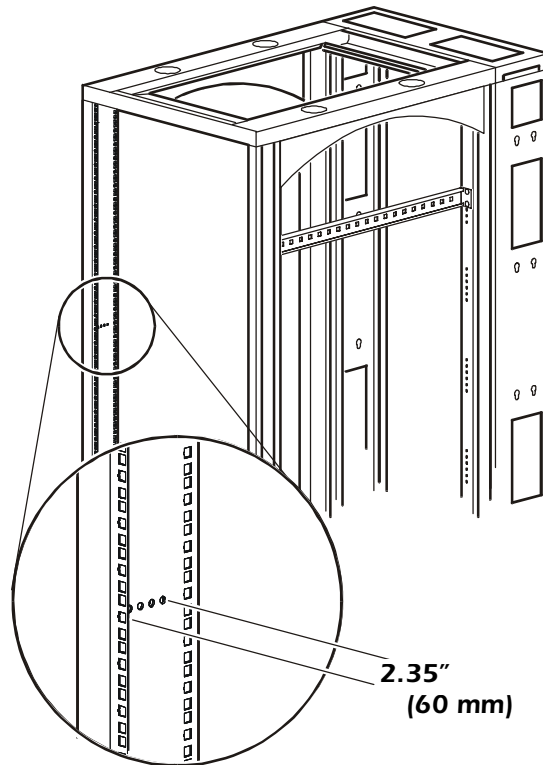
See “How to remove and install the side panels” on page 8.

Vertical Mounting Rails

The vertical mounting rails are factory-installed in the proper position for use with rack-mountable equipment that has a depth of 29.13 inches (740mm). You can adjust the rails to the front or rear a total of 2.35 inches (60mm) to accommodate different rails or equipment with various depths. The following sections describe the procedures for adjusting the position of the mounting rails and for moving them within the enclosure.

Location of screws for adjusting the mounting rail

The location of the screws that govern the position of the mounting rails is shown below.



How to adjust the mounting rails on the frame posts



Warning

To avoid personal injury or damage to the enclosure, perform this procedure with no equipment installed on the vertical mounting rails.

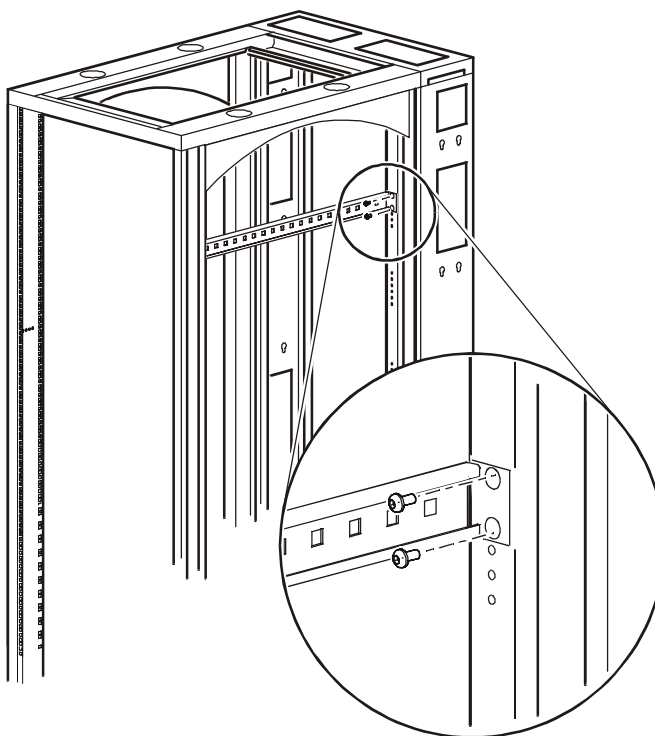
1. Use the 5-millimeter Allen wrench (included) to remove the socket-head screws from the hole in the vertical mounting rail.
2. Slide the vertical mounting rail forward or rearward as desired. Insert the screws into the appropriate holes. Tighten each screw.

Horizontal Braces

Each side of the enclosure has two horizontal braces between the vertical frame posts. These adjustable braces support the vertical mounting rails and are available for managing cables.

How to move a brace

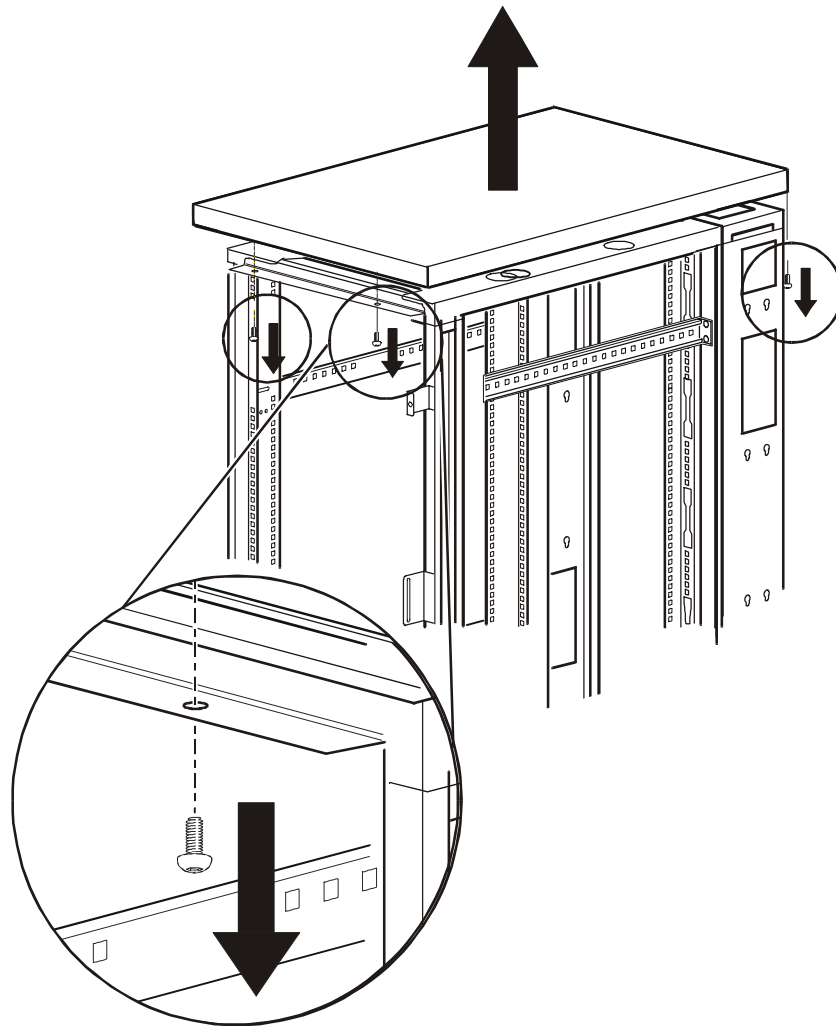
1. Use the 5-millimeter Allen wrench (included) to remove the four socket-head screws that are holding the brace to the frame posts.



2. Locate the new position for the brace and secure the brace to the frame posts.
3. Place the brace at the new position and insert a socket-head screw through the brace and frame post and tighten.

How to Remove the Roof

You can remove the roof from the enclosure by removing the four socket-head screws from the inside corners. Use the 5-millimeter Allen wrench (included).



How to Join Enclosures

You can expand your installation by joining an enclosure without sides to an enclosure with sides or by joining two enclosures without sides together. The enclosure without sides includes pre-installed expansion hardware and vertical baying trim that covers the gap between the joined enclosures for a finished appearance.

Before joining enclosures

Sometimes you need to change enclosure configurations before joining enclosures together. Often this means moving side panels or the baying hardware from one enclosure to the other.

Preliminary steps for joining enclosures:



See “How to reverse the front door” on page 16.

1. Remove the side panel from the existing enclosure or bay, if necessary.



See “How to remove and install the side panels” on page 8.

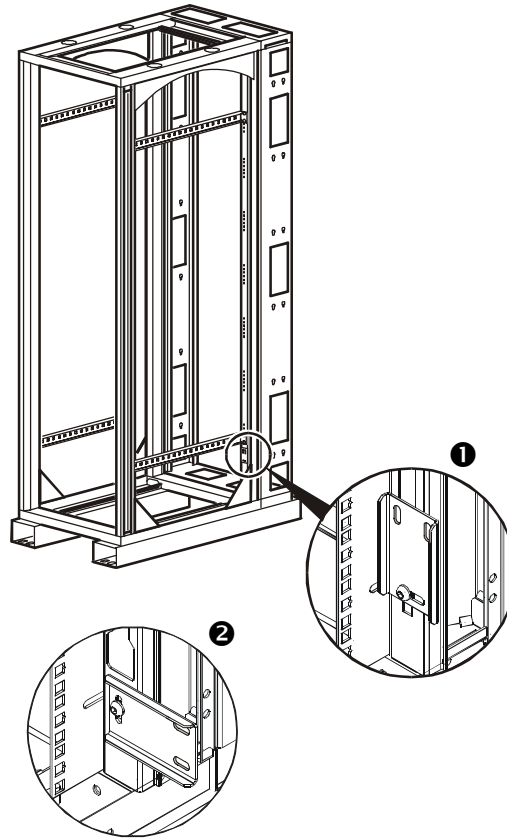
2. Move the baying trim from one side of the enclosure without sides to the other side, if necessary.



See “How to move the trim” on page 27.

Join the enclosures

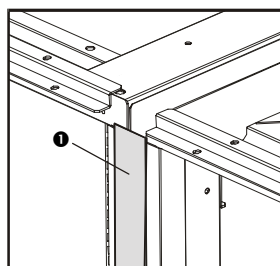
1. Connect the four baying brackets, pre-installed on the enclosure without sides, to the enclosure with sides:
 - a. Using the 5-millimeter Allen wrench (included), loosen the socket-head screw that is holding the baying bracket to the enclosure without sides.
 - b. Rotate the bracket from its original position **1** to its new position **2**.



How to Move the Baying Trim

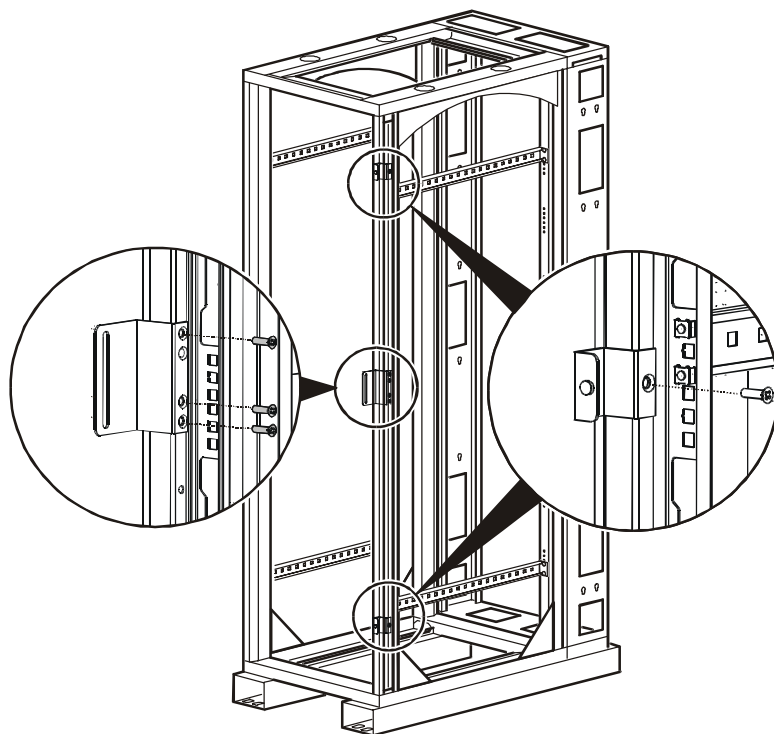
Baying trim

The baying trim ❶ is pre-installed to one side of the enclosure without sides. It covers the gap between enclosures after they have been joined together. Your site configuration may require you to move the trim to the other side of the enclosure.



How to move the trim

1. Using the 5-millimeter Allen wrench (included), remove the four socket-head screws securing the vertical trim to the frame of the enclosure.
2. Remove the countersunk screws securing the door latch bracket and the door bumper brackets and keep the screws for later use.



3. Reinstall the trim to the opposite side of the enclosure.
 - a. Insert the socket-head screw, removed from the other side of the enclosure, through the upper hole in the vertical trim, the upper door bumper bracket, and the upper hole in the frame of the enclosure, securing it with the nut.
 - b. Repeat the step above for the door latch bracket and the lower bumper bracket.
 - c. Tighten the screws securing the vertical trim to the enclosure assembly.
4. Reinstall any side panels required.



See “How to remove and install the side panels” on page 8.

Warranty and Service

Limited warranty

APC warrants the NetShelter VX Seismic Enclosure to be free from defects in materials and workmanship for a period of five years from the date of purchase. Its obligation under this warranty is limited to repairing or replacing, at its own sole option, any such defective products. This warranty does not apply to equipment that has been damaged by accident, negligence, or misapplication or has been altered or modified in any way. This warranty applies only to the original purchaser.

Warranty limitations

Except as provided herein, APC makes no warranties, express or implied, including warranties of merchantability and fitness for a particular purpose. Some jurisdictions do not permit limitation or exclusion of implied warranties; therefore, the aforesaid limitation(s) or exclusion(s) may not apply to the purchaser.

Except as provided above, in no event will APC be liable for direct, indirect, special, incidental, or consequential damages arising out of the use of this product, even if advised of the possibility of such damage.

Specifically, APC is not liable for any costs, such as lost profits or revenue, loss of equipment, loss of use of equipment, loss of software, loss of data, costs of substitutes, claims by third parties, or otherwise. This warranty gives you specific legal rights and you may also have other rights, which vary according to jurisdiction.

Obtaining service

To obtain support for problems with your NetShelter VX Seismic Enclosure:

1. Note the serial number and date of purchase. (The serial number appears on the top of the enclosure frame inside the rear door.)
2. Contact Customer Support at a phone number on the back cover of this document. A technician will try to help you solve the problem by phone.
3. If you must return the product, the technician will give you a return material authorization (RMA) number. If the warranty expired, you will be charged for repair or replacement.
4. Pack the unit carefully. The warranty does not cover damage sustained in transit. Enclose a letter with your name, address, RMA number and daytime phone number; a copy of the sales receipt; and a check as payment, if applicable.
5. Mark the RMA number clearly on the outside of the shipping carton.
6. Ship by insured, prepaid carrier to the address provided by the Customer Support technician.

Specifications

	AR2144 AR2144BLK	AR2145 AR2145BLK
Item	Measurement	
Height	81.5in (207cm)	81.5in (207cm)
Width	23.5in (59.6cm)	23.0in (58.5cm)
Depth	42.2in (107.4cm)	42.2in (107.4cm)
Net weight	545lb (162.8kg)	458lb (127.9kg)
Ventilation (front door)	782in ² (5045.2cm ²)	782in ² (5045.2cm ²)
Ventilation (rear door)	791.3in ² (5105.5cm ²)	791.3in ² (5105.5cm ²)
Ventilation (roof)	156in ² (1006cm ²)	156in ² (1006cm ²)
Clearance (for wiring between front door and vertical rail)	2.23in (5.66cm)	2.23in (5.66cm)



APC Worldwide Customer Support

Customer support for this or any other APC product is available at no charge in any of the following ways:

- Visit the APC Web site to find answers to frequently asked questions (FAQs), to access documents in the APC Knowledge Base, and to submit customer support requests.
 - **www.apc.com** (Corporate Headquarters)
Connect to localized APC Web sites for specific countries, each of which provides customer support information.
 - **www.apc.com/support/**
Global support with FAQs, knowledge base, and e-support.
- Contact an APC Customer Support center by telephone or e-mail.
 - Regional centers:

APC headquarters U.S., Canada	(1)(800)800-4272 (toll free)
Latin America	(1)(401)789-5735 (USA)
Europe, Middle East, Africa	(353)(91)702020 (Ireland)
Japan	(81) (0) 35434-2021 Guidance 3

- Local, country-specific centers: go to **www.apc.com/support/contact** for contact information.

Contact the APC representative or other distributor from whom you purchased your APC product for information on how to obtain local customer support.

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